Note

It may be easiest to read this README (with images) on Github: https://github.com/kjs222/congressional-app

Project Overview

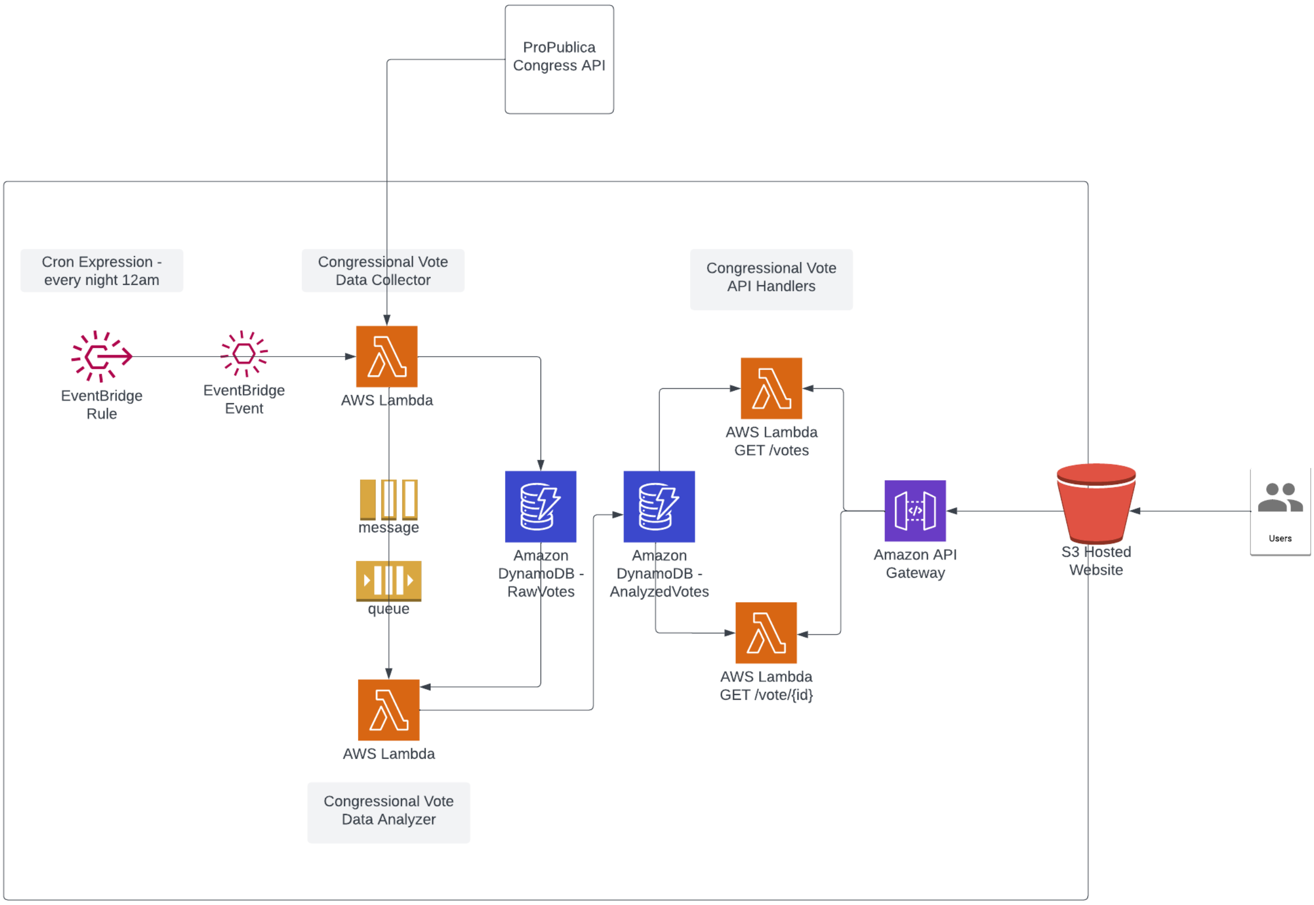
This application queries the ProPublica API daily for new senate and house votes. It does analysis on the recent votes and provides a front end application to display that information.

Tech Stack

- React Typescript frontend
- Node Typescript backend
- Infrastructure as Code via AWS CDK
- Deployed on AWS (see details below on architecture)

Architecture

- Deployed URL: http://kjs222-congressional-application.s3-website-us-east-1.amazonaws.com
- Repository: https://github.com/kjs222/congressional-app


ProPublica Congress API
Cron Expression - every night 12am
Congressional Vote Data Collector
Congressional Vote API Handlers
EventBridge Rule
EventBridge Event
AWS Lambda
AWS Lambda GET /votes
message
queue
Amazon DynamoDB - RawVotes
Amazon DynamoDB - AnalyzedVotes
Amazon API Gateway
S3 Hosted Website
Users
AWS Lambda GET /vote/{id}
AWS Lambda
Congressional Vote Data Analyzer

Architecture is described below and depicted above. Application is deployed on AWS and is managed with IAC using AWS CDK.

- backend IAC: backend/lib/congressional-app-backend-stack.ts
- frontend IAC: frontend/infrastructure/lib/congressional-app-frontend-stack.ts

Data Persistence

The application uses AWS DynamoDB (no SQL) for the data persistence layer. Two tables support the application:

- congressDataCollectorRaw
- congressAnalyzedVotes

The schema is flexible on both tables. Type safety is imposed within the application using zod schemas. All data coming in/out of the database is validated against those schemas for type safety.

See example data access here: backend/src/api/adapters/dynamo-analyzed-vote-repository.ts

I chose a no SQL database for a variety of reasons:

- the application is an MVP, and I will learn more about data access patterns as the application evolves. Changing schemas in this a No SQL datastore is trivial, compared to a SQL database. Once I understand access patterns better as the application evolves, it is possible that I will transition to a SQL datastore.
- the API aspect of the application is read-only, limiting some of the challenges I have encountered with no SQL in the past.
- the application uses an hexagonal design (aka ports and adapters) making the change of datastores relatively smooth.

Data Collector

- Deployed on: AWS Lambda (serverless)
- Invoked by: Scheduled AWS Event Bridge Event
- Code path: backend/src/data-collector
- Entry point: handler function in `backend/src/data-collector/handler.ts`

Purpose:

- makes API calls to ProPublica API to get recent congressional votes from the prior day
- persists the raw vote information in AWS Dynamo DB
- sends an event on AWS SQS for the data collector

Event Collaboration

To effectively decouple the data collector for the data analyzer (and allow them to scale independently), the collaboration between the two components is achieved through SQS events and queue. After the data collector persists raw votes obtained from the ProPublica API, it emits an event onto the SQS queue, which is picked up by the data analyzer.

Data Analyzer

- Deployed on: AWS Lambda (serverless)

- Invoked by: SQS Event
- Code path: backend/src/data-analyzer
- Entry point: handler function in `backend/src/data-analyzer/handler.ts`

Purpose:

- Perform analysis on raw data collected by data collector
- Persist analyzed data to be served up by API

API

- Deployed on: AWS Lambda (serverless) with AWS API Gateway (routing, etc)
- Invoked by: HTTP API
- Code path: backend/src/api
- Entry point: handler function in each file in the directory `backend/src/api/handlers`

Purpose:

- API for frontend application

Frontend

- Deployed on: AWS S3 Static Website
- Code path: frontend/src
- URL: http://kjs222-congressional-application.s3-website-us-east-1.amazonaws.com

A React application that interacts with the API described above to display analyzed vote information.

CI/CD

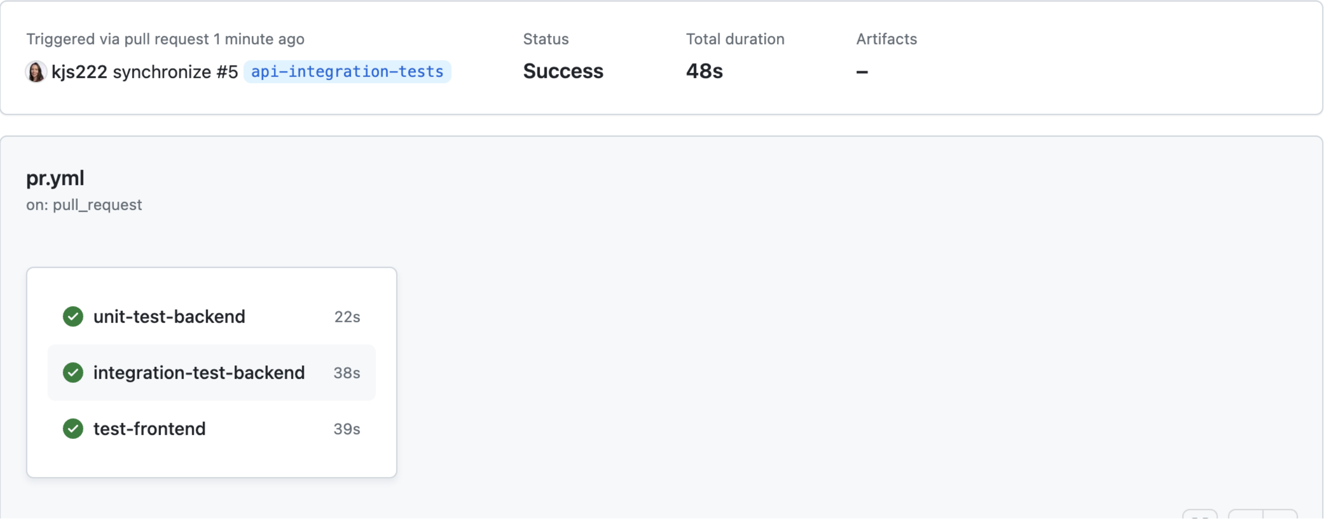
CI/CD is implemented using Github Actions:

- CI Workflow: .github/workflows/pr.yml
- CD Workflow: .github/workflows/deploy.yml

CI

The CI workflow is initiated when a PR is opened against the `main` branch. It builds the application and runs all unit and integration tests.

See examples here



Triggered via pull request 1 minute ago

kjs222 synchronize #5 `api-integration-tests`

Status

Success

Total duration

48s

Artifacts

–

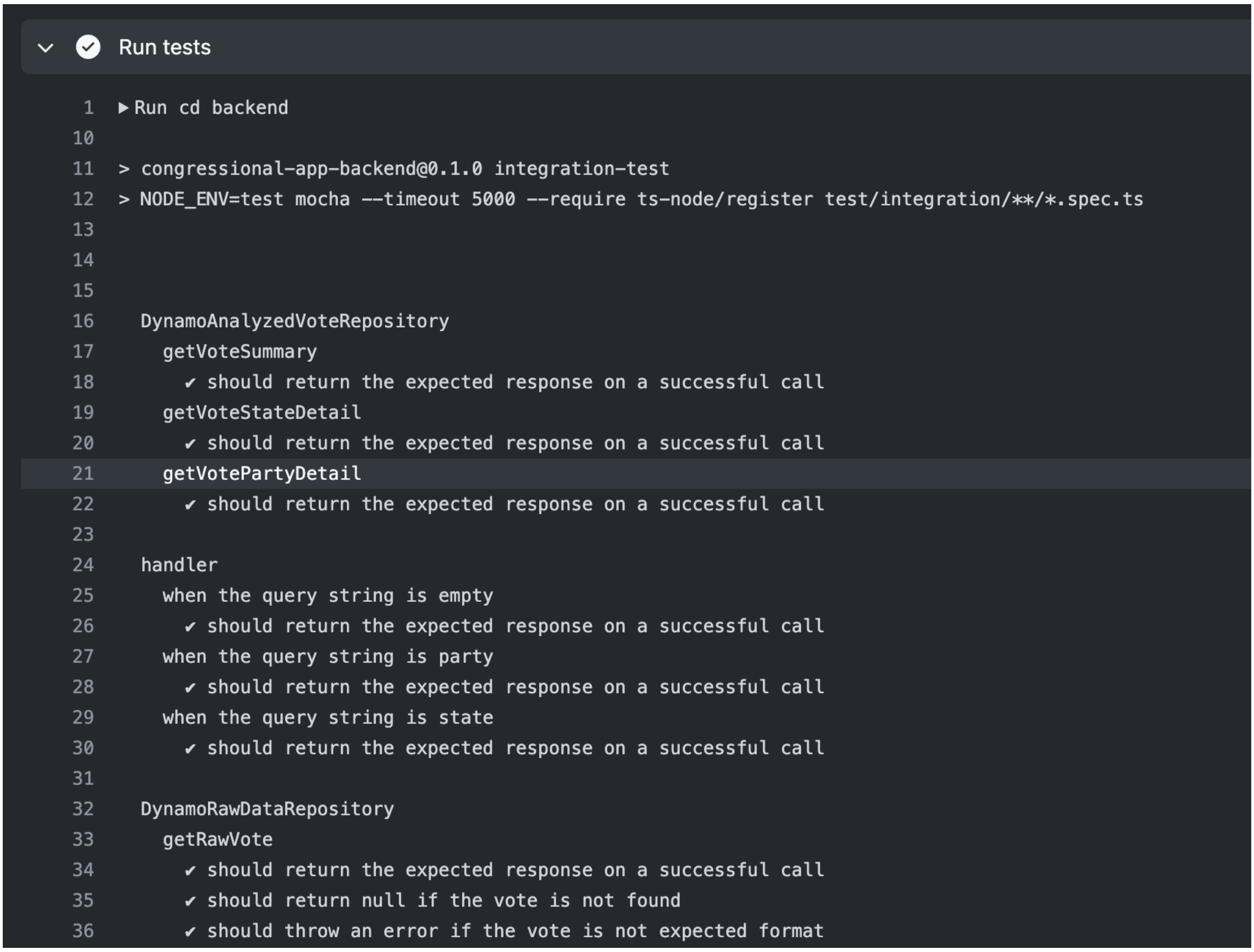
pr.yml

on: pull_request

✓ unit-test-backend 22s

✓ integration-test-backend 38s

✓ test-frontend 39s



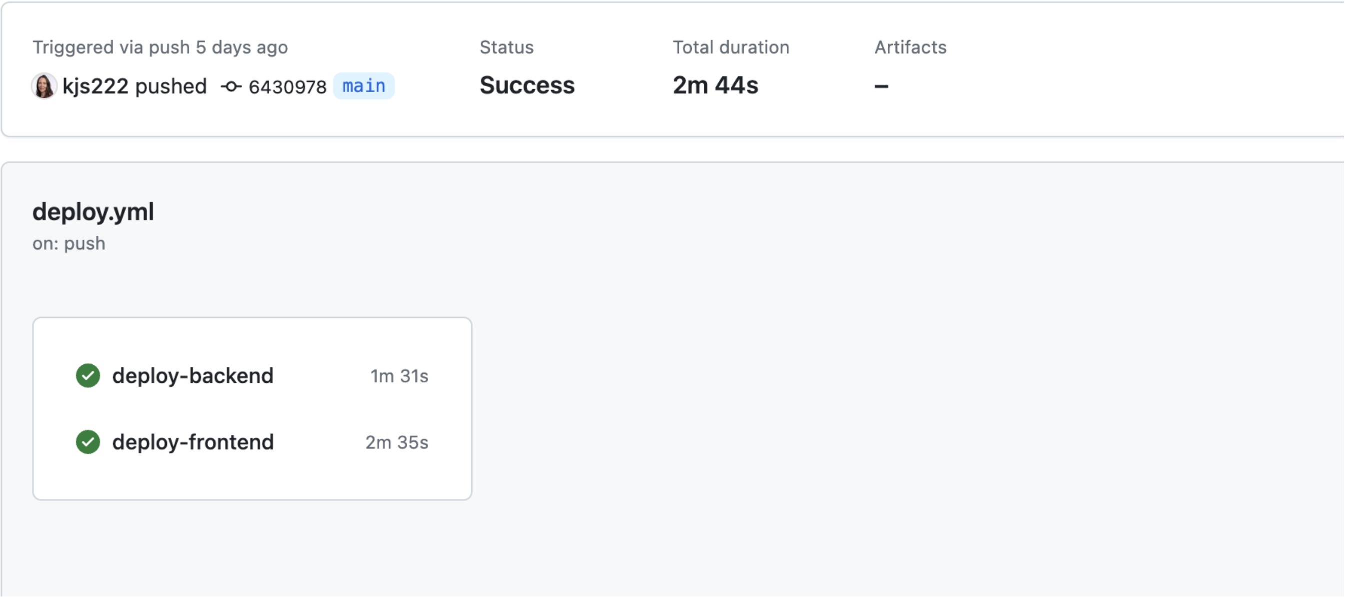
Run tests

```
▶ Run cd backend

> congressional-app-backend@0.1.0 integration-test
> NODE_ENV=test mocha --timeout 5000 --require ts-node/register test/integration/**/*.spec.ts



  DynamoAnalyzedVoteRepository
    getVoteSummary
      ✔ should return the expected response on a successful call
    getVoteStateDetail
      ✔ should return the expected response on a successful call
    getVotePartyDetail
      ✔ should return the expected response on a successful call

  handler
    when the query string is empty
      ✔ should return the expected response on a successful call
    when the query string is party
      ✔ should return the expected response on a successful call
    when the query string is state
      ✔ should return the expected response on a successful call

  DynamoRawDataRepository
    getRawVote
      ✔ should return the expected response on a successful call
      ✔ should return null if the vote is not found
      ✔ should throw an error if the vote is not expected format
```

CD

The CD workflow is initiated on a push to main. It deploys the frontend and backend applications on AWS.

See examples here



Triggered via push 5 days ago

kjs222 pushed 6430978 main

Status

Success

Total duration

2m 44s

Artifacts

–

deploy.yml

on: push

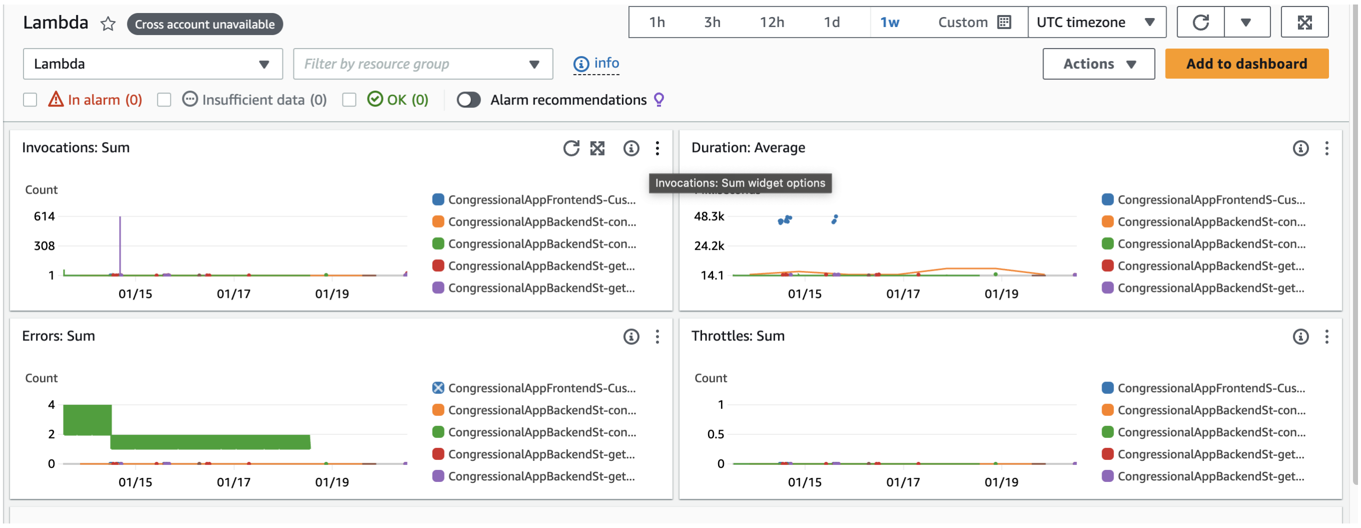
✓ deploy-backend 1m 31s

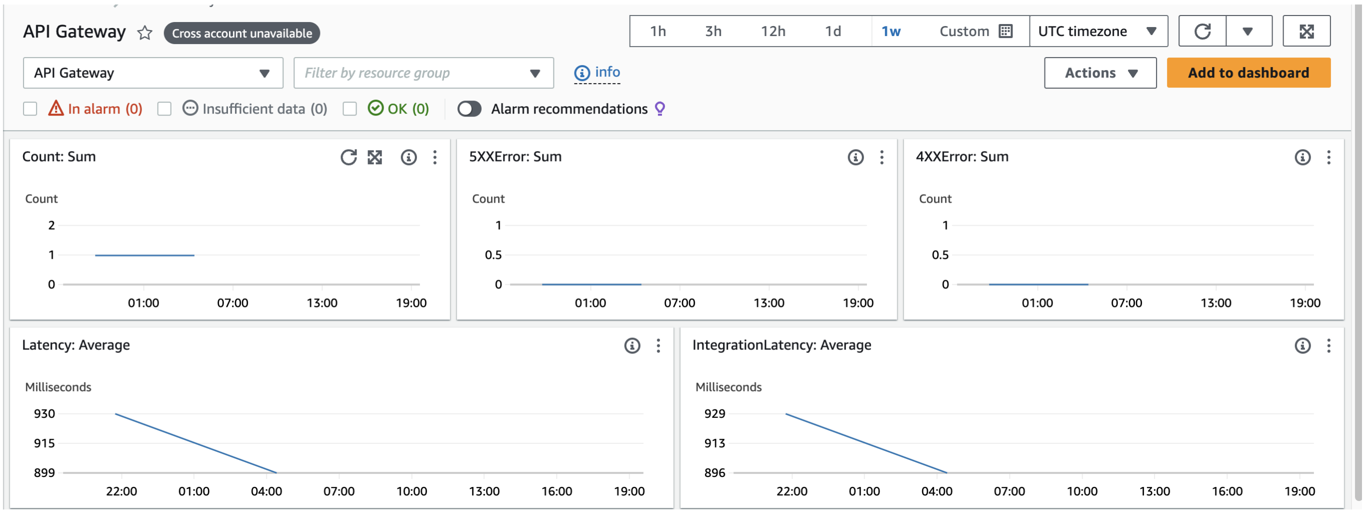
✓ deploy-frontend 2m 35s

Instrumentation + Metrics

Given that the application is entirely serverless, using Prometheus (requiring a server) seemed like an odd choice. Most production metrics tools (datadog, etc) have integration with AWS. If the application evolves, I would likely move to using one of those paid tools. But in the interim, AWS CloudWatch provides sufficient monitoring and instrumenting tools for the application.

See some examples below:





Testing

The application contains both Unit and Integration tests.

Backend tests use the following testing frameworks:

- mocha with chai
- sinon for stubs, spies and mocks

Unit Tests

Requirements:

- node - version 20, but likely lower versions work
- npm - should be installed with node

To run:

```
cd backend
npm install
npm run unit-test
```

Mocking

As indicated above, sinon is used for mocking.

See example usage here: backend/test/unit/api/vote-handler.spec.ts

Integration Tests

Additional requirements:

- docker

To run:

```
cd backend
npm install
npm run integration-test-local
```

To Run Locally

Frontend:

```
cd frontend
npm install
npm run start
```

Application will be at localhost:3000

I am not exposing the env variables needed to actually run the application however (sorry)

Backend

The backend application is a serverless application so there is no server to be run. The "handler" is the entry into each application component and it can conceivably be invoked.

Some things to note:

- to spin up a dockerized database

```
cd backend
npm install
npm run start-local-ddb
```

I am not exposing the env variables needed to actually run the application however (sorry)

Evolution and Considerations

I chose a serverless application and did not use a framework like Serverless or SAM - for the learning experience.

From my perspective, the application is well-tested despite the limitations of testing scenarios where AWS infrastructure is needed. While LocalStack could have been a solution, some of the AWS services used in this application are not available in the free version of Local Stack.

However, outside of the database integration, which is testing using a docker version of DynamoDB, the AWS interactions are very straightforward (things like: publishing a message to SQS, etc). Further, by using Typescript, it is almost difficult to get this wrong, etc.

I've always struggled a bit with using DynamoDB (as compared to SQL), because it doesn't handle relational data well, and the access patterns can be so limited. For now, it suits my needs.

Next features to add

I added an MVP frontend, but I would minimally like to add the following:

- A way to scroll to get more votes (right now it is just retrieving the last 20)
- A way to display vote analysis by the state of the member (this data exists on the backend, but hasn't been exposed on the frontend)